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Real Exchange Rate and Trade Balance in Developing Countries

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Introduction

Much of the recent literature is in agreement about the impact of real exchange rate misalignment (overvaluation or undervaluation) on the trade balance and other macroeconomic variables. One major problem of the developing countries is the overvaluation of their currencies. The main effects of overvaluation, outlined by Dornbusch (1988), are a loss in international competitiveness, reduction of domestic production, employment and fiscal revenues, adverse effects on financial markets and a chronic balance of payments crisis. The major causes of overvaluation are increased domestic absorption, loss of export revenue due to decrease in the price of exports and trade deficits resulting from rising import costs.

To correct disequilibrium in the external sector both demand management policies and exchange rate devaluation are generally suggested. There is evidence that the developing countries which have maintained a steady real exchange rate, have also succeeded in having a sustained economic growth. To keep the real exchange rate at its long run equilibrium value means that the external sector should be in equilibrium. Appropriate policies about the real exchange rate play a vital role in economic development. In the flexible exchange rate period since 1973, there has been a growing interest in examining the effect of exchange rate volatility on the trade balance.

To explain the behavior of the equilibrium real exchange rate and identify its determinants a variant of the model developed by Edwards (1988) is used in this paper. In our model the role of the relative price of tradables in terms of nontradables is integrated with the asset market for the determination of the long run equilibrium exchange rate. In presenting the model we discuss the important variables that affect the real exchange rate both in the short run and in the long run within the framework of our model. In this study we analyze how the trade balance is affected by the movements of the real exchange rate. The long run relationship between the real exchange rate and the trade balance is then investigated. The current account will affect the exchange rate through its effect on the asset market. A current account surplus will result in asset accumulation and hence will make the exchange rate appreciate. To test for long run equilibrium relationship between these two variables tests for cointegration are conducted. To specify the short run dynamics we use the the Granger representation of the error correction model (ECM) within the Vector Autoregression (VAR) framework. We examine empirically the long run relationship and the short run dynamics of the model using quarterly data on the trade balance and the real exchange rate of India over the period 1960 - 1990.

A simple model of real exchange rate determination: An Asset approach

We develop a simple model to provide a framework of analysis for the dynamics of the real exchange rate behavior and its effect on the trade balance holding the level of income constant. The country produces an export good, an import good and nontradables (N). With the relative price of exports and imports unchanging the export good and the import good are lumped together in the category, tradables (T). So there are two sectors: the tradable sector and the nontradable sector. In their portfolio people hold both domestic money (M) and foreign money (F). There is no capital mobility. To simplify the model it is assumed that there is no government sector and no tariffs. The small country assumption implies that the price of tradables is fixed in terms of foreign currency in the world market. The price of tradables is normalized to 1 i.e, $P^*_T=1$. It is also assumed that there is perfect foresight with the implication that the actual rate of depreciation is also the expected rate of depreciation. Equation (1) through equation (17) specify the model.

Asset Market

$$A=M+E.F \tag{1}$$

$$a=m+f \tag{2}$$

where $a=M/P$, $m=M/P$, $f=E*F/P$ and $P=\alpha P_T+(1-\alpha)P_N$

$$\dot{F}=0 \tag{4}$$

$$\frac{m}{f}=\sigma\left(\frac{E^e-E}{E}\right) \qquad \sigma'< 0 \tag{3}$$

Prices of exportables and importables

$$\begin{aligned} &P_M=EP_M^*; \qquad P_X=EP_X^* \\ &e_M=\frac{P_M}{P_N}; \qquad e_X=\frac{P_X}{P_N}; \end{aligned} \tag{5}$$

Demand side

Demand for tradables

$$C_T=C_T(e,a), \qquad \frac{\partial C_T}{\partial e}<0, \quad \frac{\partial C_T}{\partial a}>0; \tag{6}$$

$$C_T=C_X+C_M \tag{7}$$

Demand for nontradables

$$C_N=C_N(e,a) \qquad \frac{\partial C_N}{\partial e}>0, \quad \frac{\partial C_N}{\partial a}>0. \tag{8}$$

Supply Side

$$Q_T=Q_X+Q_M \tag{9}$$

Supply of tradables

$$Q_T=Q_T(e), \qquad \frac{\partial Q_T}{\partial e}>0; \tag{10}$$

Supply of nontradables

$$Q_N=Q_N(e), \qquad \frac{\partial Q_N}{\partial e}>0. \tag{11}$$

External Sector

$$CA=P_X^*(Q_X-C_X)-P_M^*(Q_M-C_M) \tag{13}$$

$$Exports = Q_X - C_X, \quad Imports = Q_M - C_M; \tag{12}$$

$$CA = P_X^* . Q_T - P_M^* . C_T \tag{14}$$

CA = Current Account

$$\dot{R} = CA \tag{15}$$

$$\dot{M} = \dot{D} + E\dot{R} \tag{16}$$

$$e = \alpha e_M + (1-\alpha) e_X, \quad e = E . \frac{P_T^*}{P_N} \tag{17}$$

Eq (1) gives the total assets (A) which is the sum of domestic money (M) plus foreign money in terms of domestic currency (E*F). E is the nominal exchange rate. Eq (2) defines real assets in terms of the nominal exchange rate. Eq (3) gives the portfolio composition i.e the desired ratio of real domestic money to real foreign money. This ratio is a function of the expected rate of depreciation of the nominal exchange rate. σ' is negative, that implies that if there is expectation that the exchange rate is going to depreciate then people will seek to trade in domestic money for foreign money. Eq (4) states that there is no capital movement due to the capital controls in the developing countries. Capital is not sensitive to interest rate differentials as the inflows and outflows of capital are exogenous. Eq (5) through (11) specify the demand and supply equations. e_M and e_X are the relative prices of imports and exports with respect to nontradable prices in terms of domestic currency. Demand for tradables and nontradables depend on relative prices of tradables to nontradables and real assets. Supply depends on the relative price of tradables to nontradables. Eq (12) through (17) summarize the external sector. Q_T, C_T, Q_N and C_N are the supply and demand of tradables and nontradables. Q_X, C_X, Q_M and C_M are the supply and demand of exportables and importables. Eq (12) defines exports and imports and eq (13) defines the trade balance. From (12) and (13) we can derive eq (14). Eq (14) identifies the current account as the excess demand in the tradable sector. If excess demand in the tradable sector is positive then there is a trade deficit.

Eq (15) implies that in the absence of capital mobility the balance of payments (R) is the same as the current account. R here is the change in the amount of foreign reserves held by the country in terms of foreign currency. Eq (16) gives us the relationship between the changes in money supply and the changes in domestic credit and foreign reserves. Eq (17) defines the real exchange rate (e) as the domestic relative price of tradable goods (P_T) to nontradable goods (P_N): $e=P_T/P_N$ (Edwards 1991, Dornbusch 1980). This ratio gives us an idea about the incentives that guide the resource allocation process between the two sectors. It also provides an index to measure the international competitiveness of the country's tradable sector and measures the cost of production of the tradable goods (Dornbusch and Krugman, 1976). If the real exchange rate appreciates it means that the cost of production of tradables has gone up and the country is less competitive internationally. If the exchange rate depreciates then the domestic price of tradables goes up. This means that export prices go up and resources move from the nontradable sector to the export sector, as it is more profitable to produce tradables, so the volume of exports goes up. The price of imports also goes up so the country's imports go down and domestic production of those goods goes up. So a depreciation expands the production of tradables, while reducing their demand through an increase in their relative price (Dornbusch, 1988). The net result of real exchange rate depreciation is an improvement in the trade balance.

Determination of Equilibrium Exchange Rates

For attainment of long run equilibrium of real exchange rates the nontradable goods market and the external sector both need to be in equilibrium simultaneously. This requires that the current account should be in equilibrium. There may be deviations of the trade balance from the balanced situation. This is reflected in changes in foreign reserves. In the empirical part of this work we test if these deviations of the current account are related to the deviations in the real exchange rate from its equilibrium value. In order to conduct the empirical analysis we need to define the equilibrium exchange rate and its determinants. For the real exchange rate to be at a steady state equilibrium the nontradable sector, the external sector and the asset market should be in equilibrium simultaneously (Edwards 1988).

The nontradable market clears when

$$C_N(e,a)=Q_N(e) \tag{18}$$

Thus we can express the equilibrium price of nontradables as a function of real assets (a) and P_T.

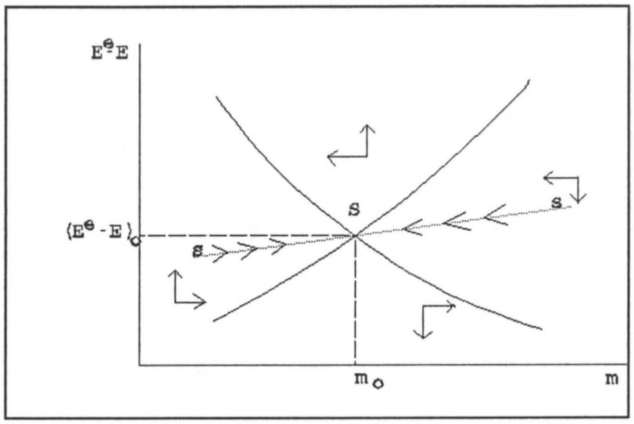
$$P_N=v(a,P_T^*,E)$$
$$\frac{\partial v}{\partial a}>0; \quad \frac{\partial v}{\partial P_T^* E}>0. \tag{19}$$

From eq (3) we have that the portfolio composition is a function of the expected rate of depreciation. Inverting this equation we get

$$\left(\frac{E^e-E}{E}\right)=g\left(\frac{m}{E.F}\right)$$
$$g'<0. \tag{20}$$

When there is equilibrium in the external sector, the expected rate of

depreciation is zero. The time path for E^e-E=0 (Fig I) is a positively sloping line. This indicates that higher exchange rates are associated with higher levels of real domestic money.



F i g
I: The steady state for exchange rates and asset market.

From eq (12) through (16) we get

$$\dot{m}=E\dot{r}+\dot{d}$$
$$\dot{r}=\frac{\dot{R}}{P},\quad \dot{d}=\frac{\dot{D}}{P} \tag{21}$$

For equilibrium in the external sector we should have m=0. The time path for m=0 has a negative slope. An increase in m results in higher demand for real assets and tradables. This causes a trade deficit so the exchange rate appreciates or in other words E decreases to restore equilibrium. The arrows indicate the forces that make the system move to or away from the equilibrium point S. If we consider a point in the first and the third quadrant the system does not converge. In the second and the fourth quadrant the system converges along the saddle path (ss). Using the equilibrium values of m and E at the steady state we can find out the equilibrium price of nontradables as defined by eq (19). Using eq (17) we get the following long run equilibrium exchange rate in the reduced form.

$$e_{LR}=v(m_o+f_o, P^*_{T_o}) \tag{22}$$

Thus the long run equilibrium exchange rate depends on the real variables such as real assets and price of tradables. In the short run however changes in D and E will affect the real exchange rate.

Measurement of Real Exchange Rate

In order to measure the real exchange rate we need data on price of tradables and price of nontradables. Information about the prices of tradables and nontradables is not available so we cannot use the real exchange rate defined as $e=EP^*_T/P_N$. We use the PPP exchange rate inspite of its shortcomings. It has been suggested by Edwards (1991) and Harberger (1986) that the domestic consumer price index (CPI) be used as a proxy for nontradable prices and the foreign wholesale or producer price index as a proxy for the world price of tradables. The bilateral exchange rate with the US has been used in our estimations as a proxy for the nominal exchange rate of India.

$$e=E\ \frac{WPI^*}{CPI} \tag{23}$$

Figures IIa and IIb show the nominal exchange rate, the real exchange rate and the trade balance in their levels and first differences.

Empirical Analysis: India

Test for stationarity

It is now common knowledge that macroeconomic series are not stationary in their levels. Before conducting any econometric analyses it is appropriate to test the data for stationarity. The graphical analysis shows that the data for the real exchange rate (e), the nominal exchange rate (E) and the trade balance (TB) are nonstationary (fig IIa & IIb). To test for unit root we used the Augmented Dickey-Fuller test. The summary of the results are reported in table 1. The null hypothesis is that the variable has unit root. We use MacKinnon(1990) test statistics as the test statistic does not follow a standard t-distribution.

The results show that we fail to reject the null hypothesis at the 1% significance level (lag=1, 2 & 3) for both the variables: trade balance and real exchange rate. The results for the first differences of the variables show that the null hypothesis can be rejected. Thus the variables are integrated of the order one or are I(1).

Table I

Augmented Dickey-Fuller Test for a Unit Root

Variable	1 Lag	2 Lags	3 Lags
TB	-3.434	-3.356	-3.359
e	-4.023	-3.384	-3.676
D(TB)	-9.295*	-6.606*	-6.938*
D(e)	-9.038*	-6.611*	-6.538*

* Dickey-Fuller t-statistic significant at 1%

From the results of the ADF test we can see that both the series have unit roots at 1% significance level.

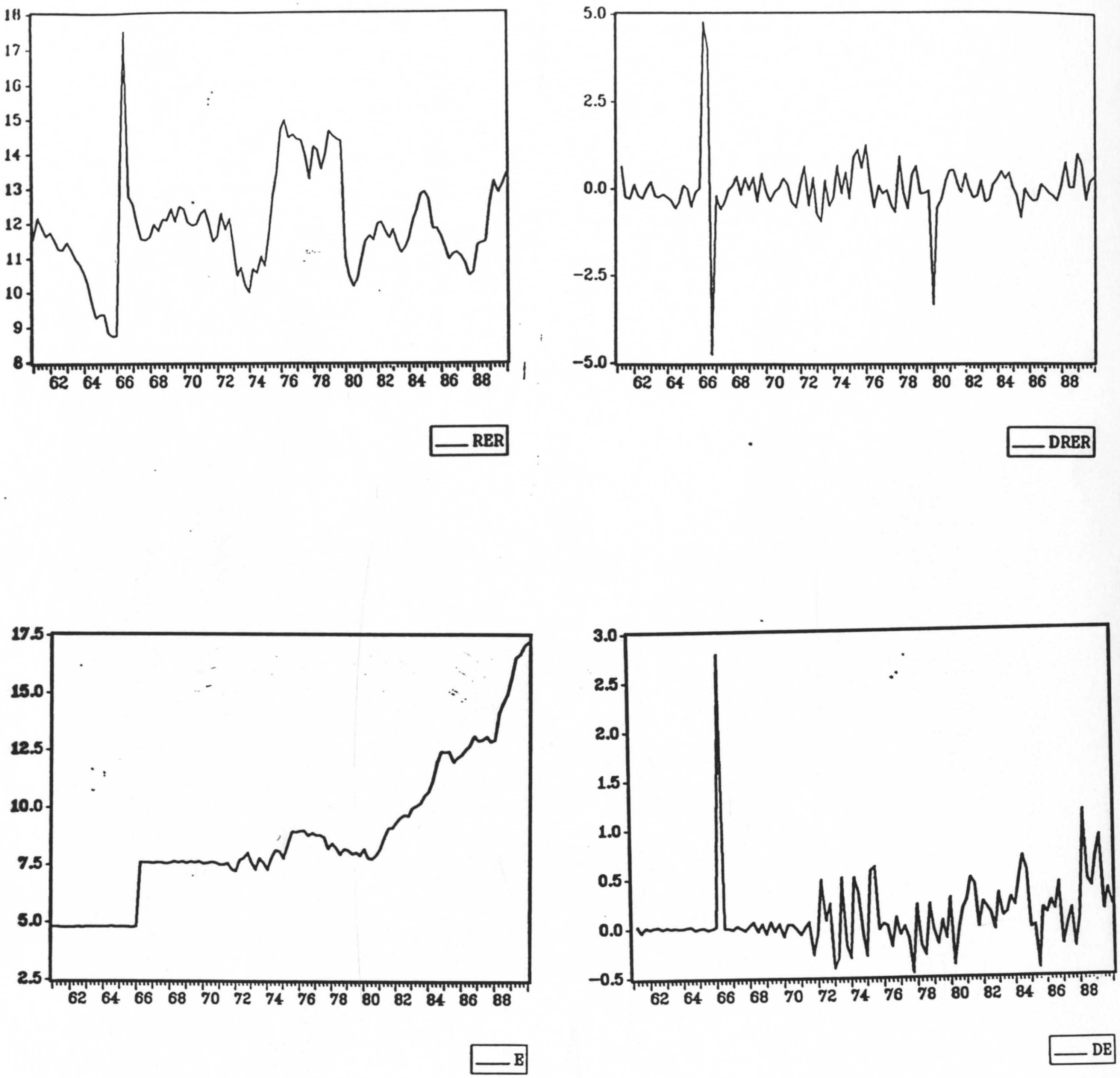


Fig IIa: Scatterplots of real exchange rate and nominal exchange rates in their levels and first differences.

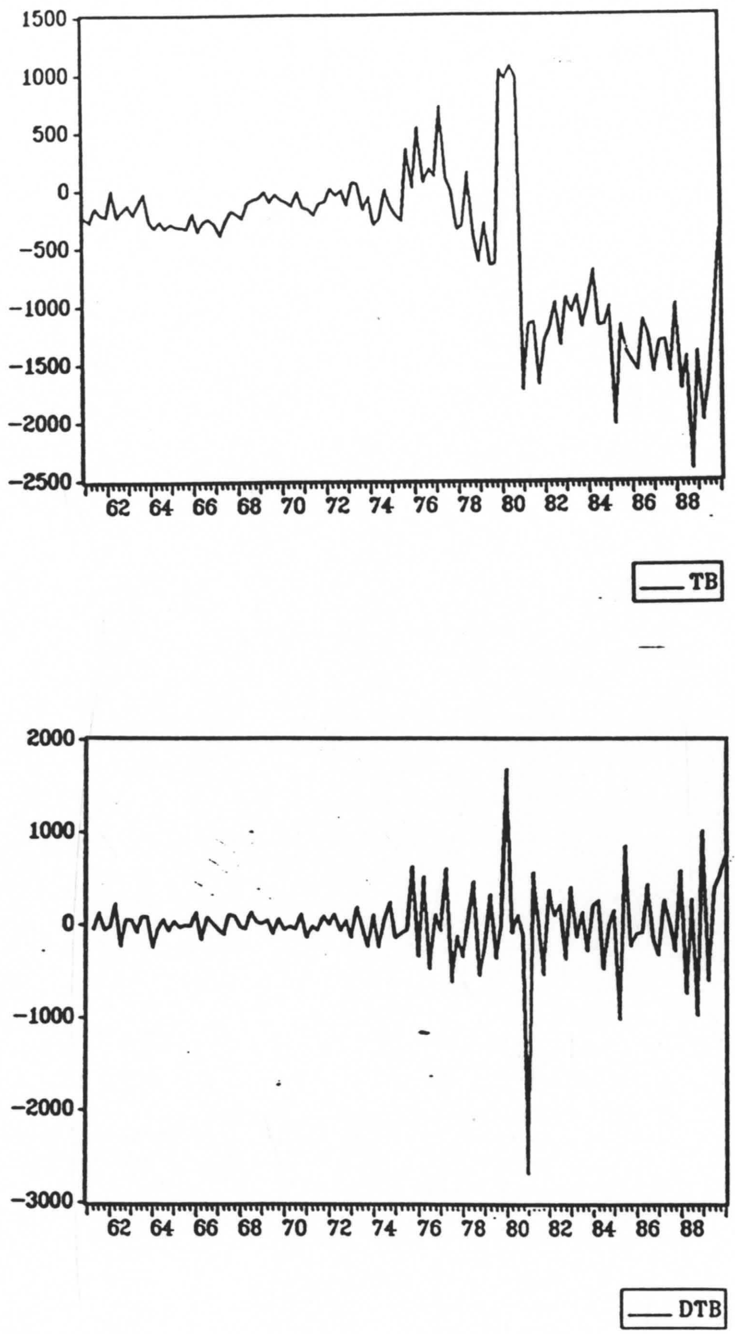


Fig IIb: Scatterplots of the trade balance in its level and first differences.

Now we can test for cointegration. Test for cointegration means looking for stable linear relationship among economic variables. If the results indicate the absence of cointegration it means that there is no linear long run stable relationship between the variables.

Tests for Cointegration

Engle and Granger(1987), Stock and Watson(1988) and Johansen(1988) have suggested alternative tests for cointegration and methods of estimating cointegrating vectors. The common factor in each of these tests is that each one tries to find the most stationary linear combinations of the vector time series.

We have used Johansen cointegration test in this paper. The Johansen method uses the maximum likelihood method of estimation. We chose this method over the Engle-Granger two step method because in the latter the results vary depending on the variable specified as the dependent variable (Dickey, Jansen and Thornton, 1991). This problem does not arise in the Johansen method as all variables are treated as endogenous and apriori specification of the direction is not required. The Johansen method estimates the cointegrating vector and the common trends based on the lagged levels of the variables. The Engle-Granger method does not use the lag information. We follow Dickey et al (1991) in reporting the results of the cointegration test in table II and table III. In this test there are two test statistics for the number of cointegrating vectors: the trace and the maximum eigen value statistics. In the trace test, the null hypothesis is that the number of cointegrating vectors is less than or equal to k. In our case k = 0 or 1. In each case the null hypothesis is tested against the general alternative. In the case of the eigen value test the null hypothesis k=0 is tested against k=1,2 etc. We reject the null hypothesis for k=0 for the trace as well as the max.eigen values. For the null hypothesis k=1 we fail to reject in both the tests. This indicates that the real exchange rate and the trade balance are cointegrated and there is one cointegrating vector.

Table II

Tests for Cointegration

Test statistics			
Trace		Max Eigen Value	
k=0	k<=1	k=0	k=1
22.92*	6.06	16.85*	6.07

* Indicates significance at 5% level

Table III

Estimated Cointegrating vectors(Normalized in brackets)

TB	e
-0.907E-4 (-1.000)	0.071229 (785.212)

The Error Correction model

The results of the cointegration indicate the existence of a long run relationship between the real exchange rate and the trade balance. The trade balance and the real exchange rate are jointly determined endogenous variables. These do not represent structural equations in the context of simultaneous equation models where both exogenous and endogenous variables constitute the model. The cointegrating vector indicates a long run stable relationship between the two variables. The estimated coefficients are consistent with the theoretical relation between the real exchange rate and the trade balance. After it is shown that there exists a long run relationship between the trade balance and the real exchange rate, the short run dynamics can be analyzed by using the error correction model (ECM). Using the Granger representation theorem (Engle and Granger, 1990) we can specify the ECM. According to the Granger representation theorem, "cointegration implies that the system follows an error correction representation and conversely an error correction system has cointegrated variables". (Engle and Granger, 1991). We specify the ECM as follows.

$$\Delta TB=\rho_1 z_{t-1}+\Delta e_{t-1}+\Delta e_{t-2}+\Delta e_{t-3}+\Delta e_{t-4}+\Delta TB_{t-1}+\Delta TB_{t-2}+\Delta TB_{t-3}+\Delta TB_{t-4}+\epsilon_{1t} \quad (24)$$

$$\Delta e_t=\rho_2 z_{t-1}+\Delta e_{t-1}+\Delta e_{t-2}+\Delta e_{t-3}+\Delta e_{t-4}+\Delta TB_{t-1}+\Delta TB_{t-2}+\Delta TB_{t-3}+\Delta TB_{t-4}+\epsilon_{2t} \quad (25)$$

where atleast one of the coefficients ρ_1 and ρ_2, is nonzero and the error terms are white noise (Engle and Granger, 1991). z_t is the residuals from the cointegating regression.

$$z_t = TB_t - A\ e_t,$$

where A is the cointegrating vector.

z_t explains the short run deviations from the long run equilibrium. It acts as a measure of the extent to which the system is away from the long run equilibrium. By using lagged values of z_t we are saying that the last period's disturbance will affect the current period. If z_t is equal to zero it means that the system is in equilibrium. The results of the error correction model are reported in table IV and table V below. We can see that both ρ_1 and ρ_2 are significantly different from zero. These coefficients reflect the disequilibrium responses i.e, the short run dynamics. The other terms reflect equilibrium responses which are the long run effects.

From the first regression (TB is the dependent variable) we see that in the long run trade balance is affected by lagged values of itself and lagged values of real exchange rate. The coefficients of z_{t-1}, lagged real exchange rate and the lagged trade balance are significant. We can conclude from these results that the real exchange rate affects the trade balance both in the short run and the long run. The coefficient of z_{t-1} is negative. This implies that in the short run the real exchange rate has a negative effect on the trade balance. In the long run however the real exchange rate has a positive effect on trade balance as its coefficient is positive and significant. These findings are consistent with the theory of the J-curve. However we need to investigate this further before we can conclude that the J-curve theory holds for this data set.

Table IV

Error correction model estimation results.(First difference of Trade balance DTB is the dependent variable)

Variables	Coefficient	T-stat
Constant	-783.839*	-2.018
z(-1)	-0.0793*	-2.009
de(-1)	-63.155	-1.315
de(-2)	4.461	0.091
de(-3)	-43.679	-0.937
de(-4)	86.957*	1.856
DTB(-1)	-0.324*	-3.294
DTB(-2)	-0.023	-0.219
DTB(-3)	0.004	0.041
DTB(-4)	-0.118*	-1.184

* t-ratios significant at 5%

For the real exchange rate the results indicate that the lagged values of trade balance do not have any effect on the real exchange rate in the long run. In our model the current account affects the real exchange rate in the short run through the asset market. In the long run the asset market is in equilibrium. The empirical findings from the second regression (e is the dependent variable) support this theoretical specification of our model. The coefficients of the lagged values of the real exchange rate (e) and the error correction term (z_{t-1}) are significant. This implies that in the short run the real exchange rate is affected positively by the trade balance but in the long run it is only affected by its own lagged values. The coefficient of z_{t-1} is positive. If there is a current account surplus, asset accumulation takes place and the exchange rate appreciates in the adjustment process. This is consistent with the popular view about the relation between the current account and the exchange rate.

Table V
Error correction model estimation results (Real Exchange rate is the dependent variable)

Variables	Coefficient	T-stat
Constant	2.2204*	2.6029
z(-1)	0.0002*	2.5992
de(-1)	0.2113*	2.0025
de(-2)	-0.1467	-1.3616
de(-3)	0.1289	1.2598
de(-4)	-0.0656	-0.6373
DTB(-1)	-0.00016	-0.7609
DTB(-2)	-0.00019	-0.8025
DTB(-3)	-0.0012	-0.5090
DTB(-4)	-8.419E-05	-0.3861

* t-ratios significant at 5%

(de and dTB are the first differences of real exchange rate and the trade balance)

Summary and conclusion

This paper uses a simple model of real exchange rate determination within the framework of the asset market. The long run relationship between the real exchange rate and the trade balance is investigated for Indian data over the period 1960 to 1990. We conduct the unit root and cointegration tests for the real exchange rate and the trade balance. Tests for cointegration between the real exchange rate and the trade balance show that there is a cointegrating relationship between these two variables. The estimated cointegrating vector is consistent with the standard view that an increase in the real exchange rate, i.e, real depreciation of the domestic currency, is associated with an improvement in the trade balance. To capture the short run dynamics between the real exchange rate and the trade balance an error correction model is used. Results indicate that a current account surplus through the accumulation of assets causes the appreciation of the exchange rate in the adjustment process.

REFERENCES

Blanchard, O.J. and S. Fischer " Lectures on Macroeconomics" MIT Press. 1989. 529-555.

Cooley, T. & Leroy, S."A Theoretical Macroeconometrics: A Critique" Journal of Monetary Economics. 1985, 16. 283-308.

Davidson, J.,D.Hendry, F.Srba and S.Yeo. " Econometric Modeling of the Aggregate Time-Series Relationship Between Consumer's Expenditure and Income in the United Kingdom" The Economic Journal, December, 1988, 661-92.

Dickey, D.A., Dennis W. Jansen and Daniel L.Thornton. "A Primer on Cointegration with an Application to Money and Income" Federal Reserve Bank of St. Louis, March/April 1991, 58-78.

Dornbusch, R. "A Portfolio Balance Model of the Open Economy." Journal of Monetary Economics. 1 (1975):3-20.

______________ "Expectations and Exchange Rate Dynamics", Journal of Political Economy, 84, No 6,(Dec 1976):1161-76.

______________"Exchange Rate and the Current Account" American Economic Review, Vol 70, No 5,(Dec 1980):960-971.

______________ "Equilibrium and Disequilibrium Exchange Rates", Zeitschrift fur Wirtschaft und Sozialwissen Shaften, 102(Dec 1982):574-599.

______________ "Exchange Rate Economics:Where Do We Stand?", Economic Interdependence and Flexible Exchange Rate, J.S.Bhandari & B.H.Putnam (editor), MIT Press, 1983.

______________ "Real Exchange Rates and Macroeconomics: A Selective Survey" Scandinavian Journal of Economics. 1990: 185-216.

______________ ., L.Helmers (eds.), The Open Economy, EDI Series in Economic Development, World Bank, 1988.

Driskill, R, A. "Exchange-Rate Dynamics:An Empirical Investigation",Journal of Political Economy,1981, Vol 89, No 2, 357-371.

Edwards, S. "Real and monetary determinants of Real Exchange Rate Behavior" Journal of Development Economics. 1988, 29, 311-341. North-Holland.

____________ "Real Exchange Rates, Devaluation, and Adjustment:Exchange Rate policy in Developing Countries." MIT Press.1991.

Engel, R.F. & C.W.J. Granger. "Co-integration and Error Correction:Representation, Estimation and Testing" Econometrica, (March 1987), 251-76.

________________________________.(eds), Long-Run economic relationships, Readings in cointegration, Oxford University Press, 1991

Frankel, J.A. "Monetary and Portfolio-Balance Model of exchange Rate Determination", Economic Interdependence and Flexible Exchange Rate, 1983, The MIT Press,85-115.

Frenkel, J.A. and M. Mussa " Asset Markets, Exchange Rates and The Balance of Payments", 1985, Handbook of International economics, 1985, North-Holland, 679-747.

Greene, W.H "Econometric Analysis", Macmillan Publishing Company, 1990.

Hsiao, C. "Autoregressive Modeling and Money-Income causality Detection" Journal of monetary Economics. 1981, 7, 85-106.

Johansen, S. "Statistical Analysis of Cointegration Vectors", Journal of Economic Dynamics and Control, (1988), 231-54.

Johansen, S. & K. Juselius. "Maximum Likelihood Estimation and Inference on Co-integration - with application to the Demand for Money", Oxford Bulletin of Economics and Statistics, (May 1990) 169-210.

Khan, N.S. and P. Montiel. "Real Exchange Rate Dynamics in a Small, Primary-Exporting Country" International Monetary Fund Paper, 1987. vol 34(4), 681-710.

Maddala, G.S. "Introduction to Econometrics" Macmillan Press. 1992.

Obstfeld, M. & Stockman, A. "Exchange Rate Dynamics", Handbook of International Economics 2, 1985, North-Holland.

Stock, J.H. & M.W. Watson. "Testing for Common Trends" Journal of the American Statistical Association, (Dec 1988) 1097-1107.

Stockman, A.C. "The Equilibrium Approach To Exchange Rates" Economic Review, Federal Reserve Bank of Richmond, 1987, Mar/Apr, 12-30.

______________ "Real Exchange Rate Variability under Pegged and Floating nominal Exchange Rate Systems:An Equilibrium Theory", Carnegie-Rochester Conference Series on Public Policy, 1988, 29, 259-294.

_______________ "Real Exchange Rates under Alternative Nominal

Exchange Rate System" Journal of International Money and Finance, 1983, 2, 147-66.

Willet,T. "Exchange Rate Volatility, International Trade and resource allocation," Journal of International Money and finance, Supplement (march,1986).

APPENDIX

DATA

Year	Trade Balance (Billions of $)	Real Exchange rate (Rs/$)	Nominal Exchange rate (Rs/$)
1961.1	-230	11.51	4.78
1961.2	-281	12.16	4.80
1961.3	-154	11.91	4.76
1961.4	-208	11.62	4.77
1962.1	-229	11.73	4.76
1962.2	0	11.53	4.77
1962.3	-234	11.24	4.78
1962.4	-181	11.23	4.78
1963.1	-127	11.44	4.78
1963.2	-207	11.22	4.78
1963.3	-120	10.98	4.79
1963.4	-29	10.82	4.79
1964.1	-274	10.57	4.79
1964.2	-326	10.24	4.80
1964.3	-267	9.67	4.81
1964.4	-330	9.27	4.80
1965.1	-289	9.37	4.79
1965.2	-315	9.36	4.80
1965.3	-320	8.85	4.78
1965.4	-330	8.74	4.78
1966.1	-196	8.76	4.79
1966.2	-352	13.55	7.58
1966.3	-273	17.51	7.58
1966.4	-248	12.75	7.58
1967.1	-288	12.54	7.56
1967.2	-387	11.95	7.58
1967.3	-276	11.53	7.58
1967.4	-183	11.50	7.55
1968.1	-204	11.59	7.56
1968.2	-244	11.95	7.62
1968.3	-107	11.77	7.59
1968.4	-80	12.09	7.63
1969.1	-67	12.07	7.56
1969.2	-13	12.41	7.62
1969.3	-104	12.02	7.59
1969.4	-36	12.47	7.63
1970.1	-84	12.38	7.54
1970.2	-99	12.01	7.56
1970.3	-138	11.92	7.59
1970.4	-20	11.95	7.58
1971.1	-150	12.25	7.50
1971.2	-160	12.37	7.50
1971.3	-214	12.00	7.56
1971.4	-118	11.46	7.28

1972.1	-107	11.60	7.21
1972.2	11	12.27	7.70
1972.3	-48	11.80	7.77
1972.4	-3	12.13	8.01
1973.1	-135	11.40	7.59
1973.2	62	10.45	7.27
1973.3	58	10.71	7.77
1973.4	-175	10.22	7.59
1974.1	-64	9.98	7.27
1974.2	-304	10.67	7.77
1974.3	-254	10.54	8.13
1974.4	-2	11.03	8.08
1975.1	-139	10.75	7.78
1975.2	-223	11.66	8.35
1975.3	-275	12.80	8.96
1975.4	350	13.40	8.94
1976.1	15	14.67	8.97
1976.2	533	14.97	8.99
1976.3	63	14.44	8.79
1976.4	175	14.54	8.88
1977.1	116	14.41	8.80
1977.2	719	14.39	8.81
1977.3	101	13.92	8.68
1977.4	-12	13.25	8.21
1978.1	-349	14.19	8.43
1978.2	-317	14.10	8.25
1978.3	146	13.53	7.96
1978.4	-395	13.97	8.19
1979.1	-627	14.64	8.15
1979.2	-297	14.50	7.97
1979.3	-655	14.39	8.03
1979.4	-643	14.35	7.91
1980.1	1036	11.02	8.19
1980.2	960	10.49	7.80
1980.3	1069	10.16	7.75
1980.4	964	10.38	7.93
1981.1	-1728	10.92	8.19
1981.2	-1158	11.47	8.68
1981.3	-1144	11.62	9.11
1981.4	-1682	11.50	9.10
1982.1	-1300	11.97	9.35
1982.2	-1196	12.01	9.54
1982.3	-979	11.75	9.67
1982.4	-1344	11.55	9.63
1983.1	-935	11.81	9.97
1983.2	-1059	11.43	10.07
1983.3	-916	11.12	10.20
1983.4	-1188	11.25	10.49
1984.1	-976	11.52	10.70
1984.2	-703	12.05	11.19
1984.3	-1175	12.34	11.89
1984.4	-1171	12.82	12.45

1985.1	-1011	12.88	12.43
1985.2	-2030	12.68	12.43
1985.3	-1177	11.83	11.99
1985.4	-1398	11.84	12.17
1986.1	-1481	11.63	12.29
1986.2	-1562	11.28	12.53
1986.3	-1127	10.94	12.69
1986.4	-1269	11.09	13.12
1987.1	-1584	11.13	12.93
1987.2	-1316	11.02	12.93
1987.3	-1301	10.82	13.10
1987.4	-1576	10.47	12.88
1988.1	-996	10.56	12.95
1988.2	-1725	11.35	14.11
1988.3	-1445	11.40	14.57
1988.4	-2416	11.45	14.95
1989.1	-1408	12.48	15.63
1989.2	-2002	13.19	16.53
1989.3	-1611	12.86	16.68
1989.4	-1089	13.07	17.04
1990.1	-357	13.40	17.23

Source: International Financial Statistics, IMF Publications.